

A new genus of Neoscopelidae for *Eomyctophum gracile* Daniltshenko from the Middle Eocene of Georgia (Pisces: Osteichthyes: Myctophiformes)

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Beckerophotus gen. n. is described for *Eomyctophum gracile* Daniltshenko, 1962 from the Middle Eocene of Georgia. This is the first fossil member of the family Neoscopelidae known by skeletal material. The new genus is distinguished from any other neoscopelids by the combination of the very elongate body, the presence of photophores, enlarged conical teeth on jaws, posteriorly placed pelvic fins and other characters.

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The lanternfishes (Myctophidae) of the genus *Eomyctophum* Daniltshenko are known from the Eocene-Oligocene deposits of the Eastern Tethyan area (Daniltshenko, 1947, 1962, 1980; Jerzmańska, 1960; Ciobanu, 1977, etc.). The original and subsequent descriptions of *Eomyctophum* are incomplete, many specimens of type series are lost and the validity and relationships of this genus are obscure. Whereas the Oligocene species of *Eomyctophum* (*E. koraense* Daniltshenko, 1947, *E. menneri* Daniltshenko, 1947, *E. limicola* Daniltshenko, 1947, *E. cozlae* Ciobanu, 1977) are true myctophids, the Eocene *E. gracile* Daniltshenko, 1962 is quite different and does not belong to Myctophidae. Several characters of the holotype of *E. gracile* show that the Eocene form is similar to Neoscopelidae rather than to any other Myctophiformes. Because the Eocene form is quite distinct from any recent genera of Neoscopelidae, a new genus, *Beckerophotus*, is described in this paper. It is the first fossil species of Neoscopelidae known by skeletal material.

The material examined is deposited in the Palaeontological Institute (PIN), Moscow.

Order MYCTOPHIFORMES

Family NEOSCOPELIDAE

Genus *Beckerophotus* gen. n.

Type species: *Eomyctophum gracile* Daniltshenko, 1962.

Diagnosis. Small and elongate fishes, maximum body depth contained nearly 8 times in standard length (SL). Head large, its length contained nearly 3.1 times in SL. Mouth gape ends well posterior to the orbit. Jaws with relatively large conical teeth. Maxillary with uniformly expanded posterior plate. Supramaxillary present, well developed. Posterior expansion of cleithrum very broad. Pelvic bones very long, narrow, not fused medially, with well developed "ischiac" and "iliac" processes. Pelvic splint bone present, free. Dorsal fin originating on anterior half of body, pelvics situated under posterior third of dorsal fin. Pectoral fin tips not reaching origin of pelvic fins. Pectoral and pelvic fins similar in size. Distance between pectorals and pelvics slightly greater than that between pelvics and anal fin origin. Anal fin originating well posterior to end of dorsal fin, with 13 or more rays. Eight procurrent caudal fin rays in the upper lobe. There are six autogenous hypurals, parhypural, stegural and second uroneural, two epurals and free second ural half-centrum (u2) in the caudal fin skeleton. Neural spine of second preural vertebra long. There are 32 vertebrae, of which 19 are caudal (including u2). Photophores not branched, arranged in two longitudinal lines on body below vertebral column. Two posterior prepelvic photophores elevated.

Included species: type species only.

Comparison. *Beckerophotus* gen. n. does not belong to the myctophids, judging from the presence of the well developed supramaxillary, well defined premaxillary processes, relatively expanded posterior plate of maxillary not forming dorsal or ventral shafts (in contrast to generalized myctophids), well developed free second ural half-centrum, position of fins and absence of typical myctophid photophore pattern (Paxton, 1972; Becker, 1983). The new genus is related to the recent *Neoscopelus* Johnson in the presence of photophores. Two other genera of the family, *Scopelengys* Alcock and *Solivomer* Miller, lack photophores. *Beckerophotus* is unique among neoscopelids in the presence of enlarged conical teeth on jaws, long, posteriorly placed pelvics, and very long pelvic bones. In the recent Neoscopelidae, the pelvics are much shorter than the pectorals and lie under the origin of the dorsal fin. The elongate body, larger mouth and shorter pectoral fins are also differentiating the new genus.

Etymology. The generic name is given in honour of the late Vladimir Eduardovich Becker for his excellent contributions to systematics of the recent Myctophidae and ends in *-photos* (Greek), a light.

Geographical and stratigraphical range. Middle Eocene (Dabachanian Formation) of Georgia.

Beckerophotus gracilis (Daniltshenko, 1962), comb. n.
(Figs 1-6)

Eomyctophum gracile Daniltshenko, 1962: 116, fig. 5; 1980: 46.

Material examined. Holotype, PIN, no. 1413-64, nearly complete skeleton, Dabachanka River, vicinity of Tbilisi, Georgia; Dabachanian Formation, Middle Eocene.

Note. Fourteen specimens of this species were described (Daniltshenko, 1962, 1980), but only the holotype is available now. The other specimens formerly deposited in PIN collection are lost.

Diagnosis. As for the genus.

Description. Body very shallow and elongate, maximum body depth contained 8 times in SL and 1.75 times as great as caudal peduncle depth. Head large and conical; orbit large and round. Snout pointed. Both upper and lower jaws long and narrow; the lower one slightly protruding. Maxillary relatively expanded posteriorly, without dorsal or ventral shafts. Premaxillary long, with well developed ascending and articular processes, completely

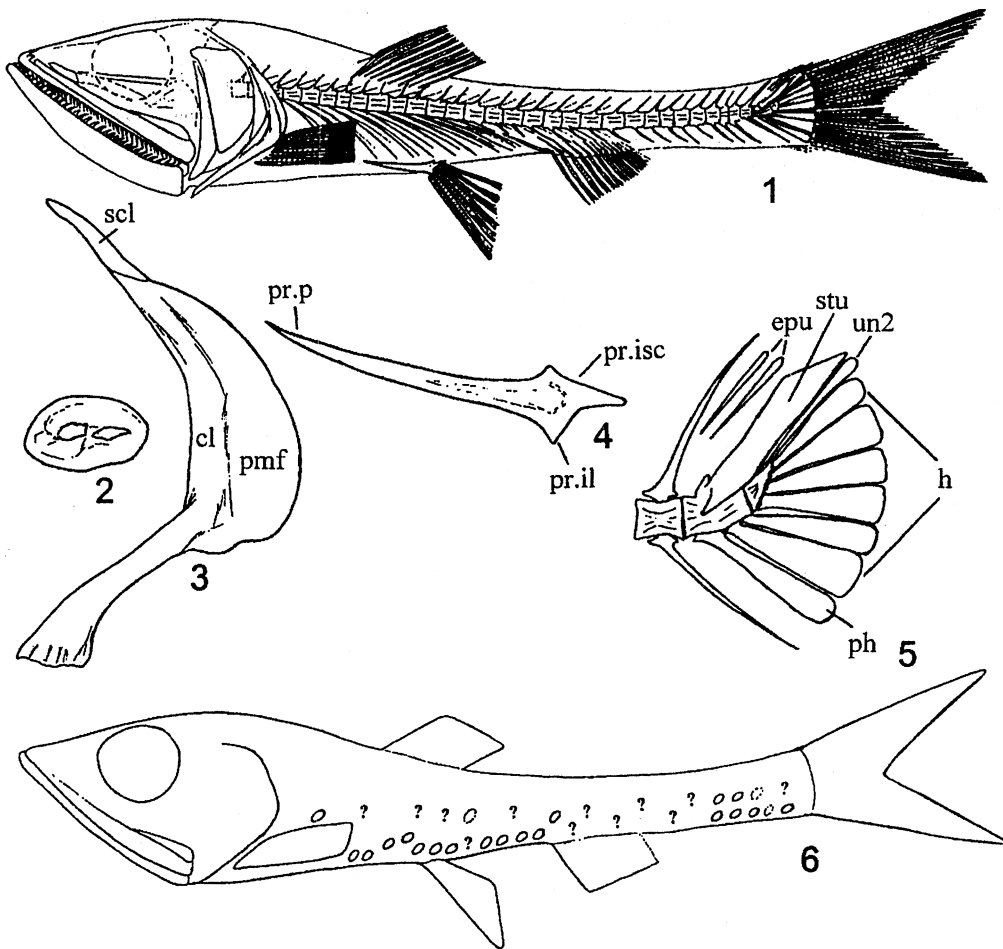
excluding maxillary from oral border. Premaxillary and dentary with relatively large, conical teeth (these longer on dentary). Supramaxillary well developed, about one-third as large as maxillary. Palatinum short, cylindrical; metapterygoideum well developed, expanded, thin, plate-like. Suspensorium and opercular series strongly inclined; quadrate bone articulated with lower jaw under opercular-hyomandibular articulation. Operculum trapezoidal, with rounded posteroventral angle. Otolith (Fig. 2) round, 1×0.75 mm.

Cleithrum S-shaped, with slightly expanded ventral arm and very broad, semi-lunar posterior expansion or plate (Fig. 3). Lower border of posterior plate with a slight incision. Supracleithrum is a thin, narrow plate. Pelvic bones (Fig. 4) very long and narrow, as long as five abdominal vertebrae combined. Pubic process spine-like; both "ischiac" and "iliac" processes well developed, triangular; "ischiac" process much longer and exceeds nearly the length of the vertebral centrum.

Dorsal fin origin slightly closer to snout tip than to caudal fin base, situated above 8th abdominal vertebra. Dorsal fin with approximately 10 rays, its base as long as 5.5 abdominal vertebrae combined. There are three vertebrae between dorsal and pelvic fin origins, the latter equidistant from snout tip and caudal base. Pelvic and pectoral fins with approximately 8 and 12 rays, respectively. Pectoral fin relatively high in position, slightly closer to ventral margin of body than to vertebral column. Tips of pectorals slightly not reaching tips of pubic processes of pelvic bones. Pelvic fins long, but not extending to anal fin origin. Anal fin situated well posterior to last dorsal ray. Caudal fin forked, with 19 (10+9) principal rays, 17 of which are branched.

Vertebrae cylindrical, with fine longitudinal crests and posteriorly inclined, narrow neural and haemal arches. Second free ural half-centrum well developed, articulated with four upper hypurals. All hypurals and parhypural autogenous; hypural fan long; hypural diastema absent (Fig. 5). Two narrow and nearly straight epurals. Tips of procurrent caudal rays not fused. Ribs long and slim. Epipleurals and epineurals present.

Scales not preserved. Photophores not completely preserved, arranged in two longitudinal rows (Fig. 6). Approximately sixteen photophores are seen in ventral row: seven before pelvics and above pelvic base, four before anal origin, and about five before lower caudal fin rays. Interspaces between these groups of photophores damaged after preparation, and photo-



Figs 1-6. *Beckerophotus gracilis* (Daniltshenko, 1962): 1, reconstruction of skeleton; 2, otolith; 3, cleithrum (*cl*) and supracleithrum (*scl*); 4, pelvic bones; 5, caudal skeleton; 6, preserved photophore pattern. *Note:* The incompletely preserved photophores are marked with interrupted line; ?, photophores are not preserved; *epu*, epurals; *h*, hypurals; *ph*, parhypural; *pmf*, posteromedial flange of cleithrum; *pr.il*, "iliac" process; *pr.isc*, "ischiac" process; *pr.p*, pubic process; *stu*, stegural; *un2*, second uroneural.

phores in these interspaces are not seen. Two prepelvic photophores raised. Photophores of lateral (upper) row badly preserved: one above middle of pectoral fin, one above 8th preserved ventral photophore, one between third and fourth haemal spines, and about three below last caudal vertebrae. Interspaces between these preserved photophores damaged, likewise to those in the ventral row. Complete number of photophores in lateral and ventral rows unknown.

Measurements. Standard length (SL) of holotype 28 mm. In % of SL: head length (HL) 32.1; maximum body depth 12.5; caudal peduncle depth 7.1; predorsal distance 42.9; prepelvic distance 50.0; preanal distance 71.4; pectoventral distance 16.1; ventroanal distance 14.3; pectoral fin length 10.7; ventral fin length 10.7; dorsal fin height 12.5; anal fin height 12.5; caudal fin length 17.9; length of caudal vertebrae 32.0; in % of HL: mouth gape 83.3; supramaxillary length 27.8.

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